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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/731,431 | 12/10/2003 | Kenji Kurata | 492322015100 | 5131 |

25227 7590 03/23/2007
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

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| EXAMINER |
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CAZAN, LIVIUS RADU

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| ART UNIT | PAPER NUMBER |
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3729

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 03/23/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-----------------|---------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/731,431 | KURATA ET AL. | |
| | Examiner | Art Unit | |
| | Livius R. Cazan | 3729 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213..

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 7-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment filed on 12/20/2006 has been fully considered and made of record. The objection to the specification and the rejection under 35 U.S.C. 112 have been overcome.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claims 1, 2, 3, and 6** are rejected under 35 U.S.C. 102(b) as being anticipated by Kano (US5539977 to Kano et al.)

Kano discloses:

- A component feeding unit (7, Fig. 2)
- A suction nozzle (14, Fig. 4)
- A line sensor (27, Fig. 4) measuring a vertical position of a lower end of the suction nozzle after the suction nozzle releases an electronic component (5, Fig. 4) to a printed board (6, Fig. 2) and before the suction nozzle picks up the next electronic component from the component feeding unit; note that the sensor 27 outputs a measured value continuously, therefore both before and after mounting operations (see col. 6, lns. 45-51)
- A drive source (see col. 4, lns. 50-55; mechanism which allows the nozzle to be lowered as described) moving the suction nozzle vertically

- A control device (31, Fig. 5) determining a range of a vertical movement of the suction nozzle based on the vertical position of the lower end of the suction nozzle measured by the position sensor; see ln. 65 of col. 7 to ln. 3 of col. 8
- A decision device (31, Fig. 5) judging that the suction nozzle holds the electronic component when the vertical position of the lower end of the suction nozzle measured by the position sensor is lower than a predetermined position; see col. 7, lns. 20-36; if the lowest measured value falls within the proper part thickness plus nozzle lower end position, then the part is present

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1, 3, and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito (JP2002208800 to Ito et al.) in view of Kano.

Ito discloses a component mounting apparatus which utilizes a line sensor to measure the vertical position of the lower end of a suction nozzle (2, Figs. 1 and 2). With reference to Figs. 1-3, as the nozzle carrying component 1 is lowered, it will interrupt the sensor after a time interval T1 (point b in Fig. 3). After mounting the

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component, as the nozzle is lifted, it stops interrupting the sensor after a time interval T2 (at point d in Fig. 3). A controller (11, Fig. 1) uses stored information about the nozzle size, part thickness, and nozzle velocity. If the time interval T2 is longer than expected, the component is still attached to the nozzle.

Ito does not disclose utilizing a sensor which measures the vertical position of the lower end of the nozzle.

As previously discussed, Kano discloses such a sensor to track the position of the lower end of the nozzle.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ito in view of the teachings of Kano, by replacing the simple line sensor of Ito with a line sensor as in Kano. One of ordinary skill in the art would have been motivated to do so in order to simplify the system. Ito relies on a complex method whereby time intervals are measured and compared with stored theoretical values. The system of Kano allows a simple visual determination of the nozzle position to be made, resulting in a simpler control system.

6. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kano in view of Takeuchi (US5661239).

Kano discloses the same invention as the Applicant, except for a decision device judging that the suction nozzle is about to fall when the vertical position of the lower end of the suction nozzle measured by the position sensor is lower than a predetermined position.

Takeuchi teaches a judging device (see col. 7, lns. 55-60; clearly a decision device exists, since the apparatus is stopped due to the detection of a low nozzle) which judges that a suction nozzle is about to fall when the vertical position of the lower end of the suction nozzle is lower than a predetermined position. Takeuchi also teaches an optical sensor could be utilized (see col. 8, lns. 10-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kano, in view of the teachings of Takeuchi, providing it with a judging device which utilizes the output of the position sensor to judge a suction nozzle is about to fall if its lower end is lower than a predetermined position. One of ordinary skill in the art would have been motivated to do so since the sensor of Kano already tracks the lower end of the nozzle and therefore no new sensors would be required. A system thus implemented would allow the apparatus to detect a nozzle which is about to fall, in order to prevent improper operation.

7. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kano in view of Okuda (US6868603 to Okuda et al.).

Kano discloses the same invention as the Applicant except for a decision device judging that the suction nozzle is missing when the vertical position measured by the position sensor is higher than a predetermined position.

Okuda teaches a judging device (500, Fig. 1) which utilizes a line sensor (20, Fig. 1) to detect whether or not a suction nozzle has fallen. If the nozzle is no longer present, the lower end of the nozzle holder will be higher than the position of the sensor, and will therefore not interrupt the sensor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kano, in view of the teachings of Okuda, by providing it with a judging device which utilizes the output of the position sensor to judge a suction nozzle has fallen if a position measured by the sensor is higher than a predetermined position. One of ordinary skill in the art would have been motivated to do so since the sensor of Kano already tracks the lower end of the nozzle and therefore no new sensors would be required. A system thus implemented would allow the apparatus to detect a fallen nozzle in order to prevent improper operation.

Response to Arguments

8. Applicant's arguments filed 12/20/2006 regarding claims 1, 2, 3, and 6 have been fully considered but they are not persuasive. Regarding the rejection in view of Kano, Applicant argues Kano does not disclose a sensor measuring the position of the lower end of the nozzle before the nozzle picks up a new component, as amended. Claim 1 recites a newly added limitation: "and before the suction nozzle picks up the next electronic component from the component feeding unit". Since the sensor of Kano outputs data continuously, it outputs data both after the suction nozzle releases the component *and* before the suction nozzle picks up a new component, as claimed. Applicant further argues Kano's line sensor does not detect the lower end of the nozzle, but rather the lower end of the electronic component. However, as is apparent from the Kano disclosure, the sensor detects a lower end position in general. That is, if a component is attached, the lowest position will be the lower end of the component. If the component has fallen, the sensor will measure the lower end of the nozzle. If there is no

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nozzle, the sensor will measure the lower end of the nozzle holder. This is identical to Applicant's invention. As discussed with respect to claim 5 in the previous Office Action, it is not possible to say the sensor measures the position of the lower end of the nozzle if there is no nozzle present. Applicant agreed to this point and amended claim 5. However, it is clear from this that Applicant's sensor measures the lowest point of whatever happens to be at the measuring station, be it the nozzle alone, a component attached to the nozzle, or just a nozzle holder.

9. Applicant's arguments with respect to claims 2-5 have been considered but are moot in view of the new ground(s) of rejection.

However, with respect to the Takeuchi reference, it should be noted that Takeuchi *does* detect a nozzle that is about to fall after having placed a component but before picking up a new component (see Fig. 2; the measuring station is indicated at 60).

With respect to the Okuda reference, Okuda teaches detecting a fallen nozzle after having placed a component but before picking up a new component (see step S4 in Fig. 4).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Livius R. Cazan whose telephone number is (571) 272-8032. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on (571)272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LRC 03/19/2007



A. DEXTER TUGBANG
PRIMARY EXAMINER